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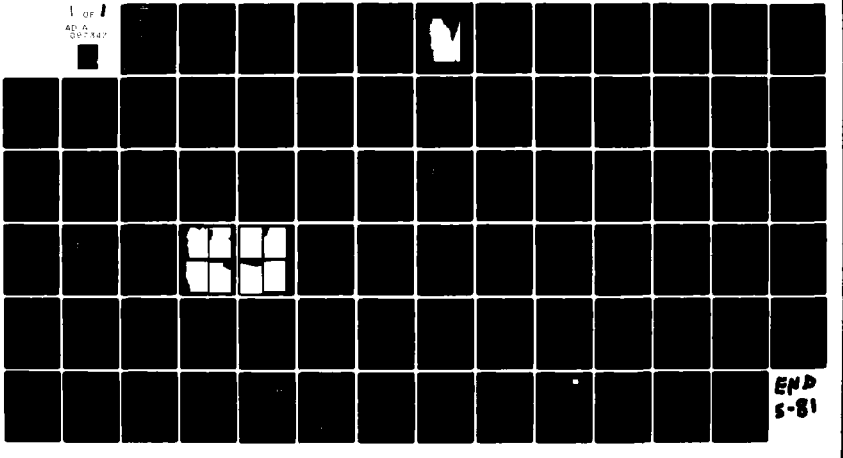

LEVEL II

SUSQUEHANNA RIVER BASIN

WEST BRANCH SUGAR CREEK, BRADFORD COUNTY

PENNSYLVANIA

POMEROY MEMORIAL RESERVOIR DAM

NDI ID NO. PA-40

DER ID NO. 8-2

BOROUGH OF TROY

PHASE I INSPECTION REPORT,

NATIONAL DAM INSPECTION PROGRAM

AD A097347

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DACW31-81-C-0012

Prepared By

L. ROBERT KIMBALL & ASSOCIATES

CONSULTING ENGINEERS & ARCHITECTS

EBENSBURG, PENNSYLVANIA

15931

FOR

DEPARTMENT OF THE ARMY

BALTIMORE DISTRICT CORPS OF ENGINEERS

BALTIMORE, MARYLAND

21203

MARCH, 1

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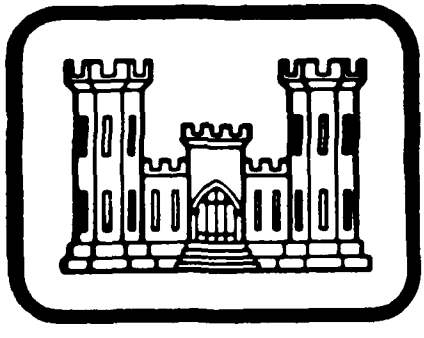

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in detemining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM INSPECTION REPORT

NAME OF DAM	Pomeroy Memorial Reservoir Dam
STATE LOCATED	Pennsylvania
COUNTY LOCATED	Bradford
STREAM	West Branch of Sugar Creek
DATES OF INSPECTION	October 22, 1980 and January 15, 1981
COORDINATES	Lat: 41° 47.2' Long: 76° 49.3'

ASSESSMENT

The assessment of Pomeroy Memorial Reservoir Dam is based upon visual observations made at the time of inspection, review of available records and data, hydraulic and hydrologic computations and past operational performance.

The Pomeroy Memorial Reservoir Dam appears to be in poor condition and poorly maintained. The concrete on the upstream slope of the dam is in a deteriorated condition as is the concrete in the spillway section. The spillway retaining walls are visibly deteriorated and a section of the right spillway wingwall has cracked and fallen away from the structure. Maintenance of the dam and operating facilities is considered poor. The drainline valves have not been operated in the recent past.

Pomeroy Memorial Reservoir Dam is a high hazard-small size dam. The recommended spillway design flood (SDF) for a dam of this size and classification is in the range of 1/2 PMF to PMF. Based on the downstream potential for loss of life, the spillway design flood has been selected as the PMF. The spillway and reservoir are capable of controlling approximately 9% of the PMF without overtopping the embankment low spot. If the low spot elevation were to be filled to an elevation consistent with the remaining portion of the embankment crest the spillway and reservoir would be capable of controlling approximately 20% of the PMF without overtopping the embankment. Based on criteria established by the Corps of Engineers, the spillway is termed inadequate.

The following recommendations and remedial measures should be instituted immediately.

1. A detailed hydrologic and hydraulic analysis should be conducted by a registered professional engineer knowledgeable in dam design and construction to increase the spillway capacity.

2. The concrete on the upstream slope of the dam, the concrete weir and spillway wingwalls should be repaired.

3. The low spot on the embankment crest should be filled to the design height.

4. It should be ascertained whether the upstream valve on the 16" cast iron pipe drainline is capable of operation. If the valve on the 8" and 16" pipes are operable they should be lubricated and excerised on a regular basis. If the upstream valves are not operable, they should be made operable or other provisions should be made for upstsream closure of the pipes through the embankment.

5. The brush and trees should be cleared from the slopes and removed from the spillway exit channel at the direction of a professional engineer knowledgeable in design and construction of dams.

6. A warning system should be developed to warn downstream residents of large spillway discharges or imminent failure of the dam.

7. A safety inspection program should be implemented with inspections at regular intervals by qualified personnel.

8. A regularly scheduled operations and maintenance program should be planned and implemented at the dam.

SUBMITTED BY:

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS AND ARCHITECTS

FEB. 25, 1981
Date

R. Jeffrey Kimball
R. Jeffrey Kimball, P.E.

APPROVED BY:

27 MARCH 1981
Date

James W. Peck
JAMES W. PECK
COL, Corps of Engineers
District Engineer

Overview of Pomeroy Memorial Reservoir Dam

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APPENDICES

PHASE I
NATIONAL DAM INSPECTION PROGRAM

POMEROY MEMORIAL RESERVOIR DAM
NDI. I.D. NO. PA 40
DER I.D. NO. 8-2

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. The Pomeroy Memorial Reservoir Dam is an earthfill dam, 442 feet long and 24 feet high. The crest width of the dam is 6 feet. The upstream slope of the dam is paved (2H:1V) with a 3 foot high vertical concrete retaining wall at the top of the slope. The retaining wall is an extension of the concrete corewall. The downstream slope of the dam is 2H:1V and is grass covered. Some heavy brush is located on the downstream slope adjacent to the left abutment and some large trees exist on the downstream slope near the right abutment contact.

A concrete structure exists on the upstream slope of the dam which contains the control valve which regulates the drainline. Access to the structure is by way of a wooden plank walkway from the crest to the top of the concrete structure.

The spillway is located at the left abutment and consists of a semi-ogee shaped concrete weir with a crest length of 80 feet.

b. Location. The dam is located on the West Branch of the Sugar Creek, approximately 2 miles west of the Borough of Troy, Bradford County, Pennsylvania. The Pomeroy Memorial Reservoir Dam can be located on the Troy, U.S.G.S. 7.5 minute quadrangle.

c. Size Classification. The Pomeroy Memorial Reservoir Dam is a small size dam (24 feet high, 71 acre-feet).

d. Hazard Classification. The Pomeroy Memorial Reservoir Dam is a high hazard dam. Downstream conditions indicate that loss of more than a few lives is probable should the structure fail. The Borough of Troy is located approximately 2.3 miles downstream of the dam.

e. Ownership. The Pomeroy Memorial Reservoir Dam is owned by the Borough of Troy. Correspondence should be addressed to:

Mr. Arthur Barrett (Borough Manager)
Almira Street
Troy, Pennsylvania 16947
717/297-2966

f. Purpose of Dam. The dam was originally constructed for the purposes of supplying water to the Borough of Troy. The reservoir was abandoned as a water supply approximately 15 to 20 years ago and is currently unused.

g. Design and Construction History. Based on information in the PennDER files, it appears as though the initial design of the dam was completed in 1913 by Mr. Henry W. Taylor, a hydrologic and sanitary engineer from Albany, New York. Construction of the dam was not completed due to a lack of funds. In 1922 a second permit application was prepared and the application included modifications to the original design of the dam. The modifications to the dam included plans to double the initial storage capacity. The engineer who designed the proposed modifications was Mr. Henry W. Taylor. A memo in the DER files indicates that construction of the dam was completed in the fall of 1923. In 1931 an application was filed to raise the dam and increase the spillway capacity. The 1931 modifications included raising the height of the dam an additional 1.5 feet and extending the corewall to the top of dam. The spillway crest was to be raised an additional 2.5 feet with a weir length of 80 feet. Approval for the modifications was granted in June of 1931. The original construction of the dam and the subsequent modifications were completed by Borough employees under the direction of the design engineer.

h. Normal Operating Procedures. The reservoir is not currently used for water supply. No operations have been conducted at the dam for approximately 15 to 20 years. In 1979, the drainline blowoff was opened to reduce the head on the dam and the reservoir level has been maintained at a reduced level since that time.

1.3 Pertinent Data.

a. Drainage Area. 2.25 square miles

b. Discharge at Dam Site (cfs).

Maximum known flood at dam site	Unknown
Drainline capacity at normal pool	Unknown
Spillway capacity at top of dam	680

c. Elevation (U.S.G.S. Datum) (feet). - Field survey based on an assumed spillway crest elevation, 1290.0 feet U.S.G.S. 7.5 minute quadrangle.

Top of dam - low point	1291.8
Pool at time of inspection	1283.7
Spillway crest	1290.0
Maximum pool - design surcharge	Unknown
Normal pool	1290.0
Spillway crest	1290.0
Upstream portal - 16" drainline (approximate)	1270.0
Downstream portal - 16" drainline	1267.7
Maximum tailwater	None
Toe of dam	1267.7

d. Reservoir (feet).

Length of maximum pool	1200
Length of normal pool	1000

e. Storage (acre-feet).

Normal pool (spillway crest)	54
Top of dam	71

f. Reservoir Surface (acres).

Top of dam	10
Normal pool	9
Spillway crest	9

g. Dam.

Type	Earthfill
Length (including spillway)	442 feet
Height	24 feet
Top width	6 feet
Side slopes - upstream	2H:1V
- downstream	2H:1V

Zoning	Unknown
Impervious core	Concrete corewall
Cutoff	Yes
Grout curtain	Unknown

h. Reservoir Drain.

Type	16" cast iron pipe and 8" cast iron pipe
Length	Approximately 100 feet
Closure	Gate valve
Access	Concrete structure from upstream slope of dam
Regulating facilities	Housed in concrete structure on upstream slope of dam

i. Spillway.

Type	Semi-ogee
Length	80 feet
Crest elevation	1290
Upstream channel	Lake (unrestricted)
Downstream channel	West Branch Sugar Creek

SECTION 2
ENGINEERING DATA

2.1 Design. Review of available information in the files of the Commonwealth of Pennsylvania, Department of Environmental Resources revealed that some correspondence, permit information and pictures were available for review. A location plan and a section and detail drawing were provided by Mr. Arthur Barrett, the Troy Borough Manager. All this information was reviewed to complete this report. Mr. Arthur Barrett, the Troy Borough Manager, accompanied the inspection team during the inspection of the Pomeroy Memorial Reservoir Dam.

2.2 Construction. No information exists regarding the construction of the dam other than the work was completed by Borough employees.

2.3 Operation. No operating records are maintained.

2.4 Evaluation.

a. Availability. Engineering data were provided by PennDER, Bureau of Dams and Waterway Management. The Borough Manager of the Borough of Troy was interviewed to obtain data of operation and maintenance of the dam.

b. Adequacy. This Phase I Report is based on the visual inspection and hydrologic and hydraulic analysis. Sufficient information exists to complete a Phase I Report.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. The onsite inspection of the Pomeroy Memorial Reservoir Dam was conducted by personnel of L. Robert Kimball and Associates on October 22, 1980 and January 15, 1981. The inspection consisted of:

1. Visual inspection of the retaining structure, abutments and toe.
2. Examination of the spillway facilities, exposed portion of any outlet works and other appurtenant works.
3. Observations affecting the runoff potential of the drainage basin.
4. Evaluation of the downstream area hazard potential.

b. Dam. The dam appears to be in poor condition. From a brief survey conducted during the inspection, it was noted that a low spot exists adjacent to the right spillway wingwall. The upstream slope of the dam is paved with concrete. Cracks were visible in the paving along the entire exposed portion of the slope. The concrete retaining wall at the top of the slope (corewall extension) has deteriorated to a point where some of the concrete had fallen away from the retaining wall. Trees and brush exist on the downstream slope of the dam with the heavier concentration of trees located near either end of the embankment section. A wet area was observed beyond the toe of the dam between the spillway discharge channel and the drainline discharge structure.

c. Appurtenant Structures. The spillway was in a deteriorated condition. The concrete wingwalls showed visible cracking and sections of the right spillway wingwall had fallen away onto the upstream face of the spillway section. Heavy brush and debris were observed in the spillway discharge channel. The spillway crest has visibly deteriorated and debris and silt have collected against the upstream face of the section and along a portion of the crest.

The drainlines were not operated during the inspection. A small amount of ponded water was observed at the location of the drainline discharge structure.

d. Reservoir Area. The watershed is covered almost equally with forested areas and farmland. The reservoir slopes are moderately steep but do not appear to be susceptible to landslides which would affect the storage volume of the reservoir or overtopping of the dam by displacing water.

e. Downstream Channel. The West Branch of Sugar Creek is relatively narrow along its entire length to the Borough of Troy. At the Borough of Troy, the West Branch of Sugar Creek joins Sugar Creek. The Borough of Troy is located approximately 2 miles downstream of the dam. The population of the Borough is in excess of 1,000 people.

3.2 Evaluation. In general, the dam and appurtenant structures appear to be in poor condition and poorly maintained. It was reported by the Borough Manager, Mr. Arthur Barrett, that the reservoir has not been used as a water supply for the past 15 to 20 years.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures. The reservoir has been maintained at a reduced level since 1979. The 8" former water supply line blow-off has been operated intermittently since 1979. The 16" diameter cast iron pipe has not been operated for years. It was reported by the Borough Manager that the Borough never knew the line existed until recently.

4.2 Maintenance of the Dam. No planned maintenance schedule exists for the dam. Maintenance of the dam is performed by Borough employees on an unscheduled basis and consists of cutting brush on the downstream slope of the dam.

4.3 Maintenance of Operating Facilities. Only the 8" former water supply line blow-off has been operated and maintenance of this line is planned. It was reported by the Borough manager that plans are in progress to determine the capability of the 16" line to function. The operation of the 8" supply line consisted of the operation of a blow-off valve located downstream of the dam. Neither the 16" nor the 8" valves located in the control structure on the upstream slope of the dam have been operated in many years.

4.4 Warning System in Effect. There is no warning system in effect to warn downstream residents of large spillway discharges or imminent failure of the dam.

4.5 Evaluation. Maintenance of the dam and operating facilities is considered poor. It was reported by the Borough manager that plans are being made to determine if the valves located in the control structure on the upstream slope of the dam are operable.

An emergency action plan should be available for every dam in the high and significant category. Such plans should outline actions to be taken by the operator to minimize downstream affects of an emergency and should include an effective warning system. No emergency action plan has been developed and the owner should develop such a plan.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features.

a. Design Data. Limited information relative to the hydrologic and hydraulic design was available. Available information was in regards to the original design and no data is associated with the modifications completed in 1931.

b. Experience Data. No rainfall, runoff or reservoir level data were available. The spillway reportedly has functioned adequately in the past.

c. Visual Obeervations. The spillway appeared to be in poor condition and poorly maintained. Brush and debris was observed in the spillway discharge channel.

The low spot on the embankment crest was observed adjacent to the right spillway wingwall. The low spot area was a localized condition and confined to the area immediately adjacent to the right spillway wingwall. The remaining portion of the crest appeared to have a relatively consistent crest elevation.

d. Overtopping Potential. Overtopping potential was investigated through the development of the probable maximum flood (PMF) for the watershed and the subsequent routing of the PMF and fractions of the PMF through the reservoir and spillway.

The Corps of Engineers, Baltimore District, has directed that the HEC-1 Dam Safety Version systemized computer program be utilized. The program was prepared by the Hydrologic Engineering Center (HEC), U.S. Army Corps of Engineers, Davis, California, July, 1978. The major methodologies or key input data for this program are discussed briefly in Appendix D.

5.2 Evaluation Assumptions. To enable us to complete the hydraulic and hydrologic analysis for this structure, it was necessary to make the following assumptions.

1. Pool elevation in the reservoir prior to the storm is at the spillway crest elevation, 1299.0.

2. The top of dam was considered to be low spot elevation, 129 .

3. The spillway crest was assumed to be a constant elevation along its entire length. Approximately 1/4 of the crest length is several inches lower than the remaining portion of the crest.

5.3 Summary of Overtopping Analysis. Complete summary sheets for the computer output are presented in Appendix D.

Peak inflow (PMF)	7190 cfs
Spillway capacity	680 cfs

a. Spillway Adequacy Rating. The Spillway Design Flood (SDF) is based on the hazard and size classification of the dam. The recommended spillway design flood for a dam of this size and classification is in the range of 1/2 PMF to PMF. Based on the potential loss of life, the spillway design flood has been selected as the PMF. Based on the following definition provided by the Corps of Engineers, the spillway is rated as inadequate as a result of our hydrologic analysis.

> Inadequate - All high hazard dams which do not pass the spillway design flood (PMF).

The spillway and reservoir are capable of controlling approximately 9% of the PMF without overtopping the embankment. If the low spot area were filled to an elevation consistent with the remaining portion of the crest, the spillway and reservoir would be capable of controlling approximately 20% of the PMF without overtopping the embankment.

5.4 Summary of Dam Breach Analysis. As the subject dam cannot satisfactorily pass 50% of the PMF (based on our analysis) it was necessary to perform the dam breach analysis and downstream routing of the flood wave. This analysis determined the degree of increased flooding due to dam failure. A pool elevation of 1293.0 was considered sufficient to cause failure of the dam due to overtopping.

The results of the dam breach analysis indicate that the downstream potential for loss of life and property damage is not significantly increased by dam failure. Therefore, the spillway is rated as inadequate and not seriously inadequate. Details of the downstream routing of the flood wave are included in Appendix D.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. No visible deficiencies were observed on the embankment which would affect the stability of the structure. Only minor erosion was observed in the area of the low spot elevation located adjacent to the right spillway wingwall. No seepage was observed during the inspection although a wet area was observed beyond the toe area between the spillway discharge channel and the drainline discharge structure. No movement of water was observed in this area. Large trees are located on the downstream slope near the right abutment. Several smaller trees are present on the remainder of the downstream slope.

The spillway was in a visibly deteriorated condition. Cracks were observed in the spillway wingwalls and a portion of the right spillway wingwall had fallen away into the spillway approach area. The spillway weir was in a deteriorated condition and debris was observed at the toe of the overflow section of the weir and in the discharge channel.

b. Design and Construction Data. Limited information relative to the original design of the dam was available in the DER files. The existing dam appears to have been the result of the original design which included modifications prior to completion of the dam in the fall of 1923. No construction data was available for review. Based on information contained in the DER correspondence file it appears as though work was completed by Borough employees.

c. Operating Records. No operating records exist for this dam.

d. Post Construction Changes. Based on information contained in the DER correspondence file, it appears as though an application to raise the top of the dam and increase the spillway capacity was made by the Borough in 1931. The changes to the dam included raising the height of the dam by 1.5 feet, extending the corewall to the new top of dam elevation, and increasing the spillway weir length from 52 to 80 feet. The modifications to the dam were designed by Mr. Henry W. Taylor of Albany, New York. The approval for the construction changes was granted in June of 1931.

e. Seismic Stability. The dam is located in seismic zone 1. No seismic stability analyses has been performed. Normally, it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake loading. Since no signs of instability were noted during the inspection, the Pomeroy Memorial Reservoir Dam is assumed to be safe for earthquake loading.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The dam appears to be in poor condition and poorly maintained. Only minor erosion was observed in the area of the low spot elevation adjacent to the right spillway wingwall. No seepage was observed during the inspection although a wet area was observed beyond the toe of the dam between the spillway discharge channel and the discharge structure for the drainline. The concrete paving on the upstream slope of the dam was in a deteriorated condition as was the concrete weir and spillway wingwalls. A portion of the right spillway wingwall had cracked and fallen away from the structure. The visual observations, review of available data, hydrologic and hydraulic calculations and past operational performance indicate that the Pomeroy Memorial Reservoir Dam is capable of controlling approximately 9% of the PMF. If the low spot on the embankment adjacent to the right spillway wingwall were filled to an elevation consistent to the remaining portion of the crest, the spillway and reservoir would be capable of controlling approximately 20% of the PMF. The spillway is termed inadequate but not seriously inadequate.

b. Adeqacy of Information. Sufficient information is available to complete a Phase I Report.

c. Urgency. The recommendations suggested below should be implemented immediately.

d. Necessity for Further Investigation. In order to accomplish some of the recommendations/remedial measures outlined below, further investigations will be required by a professional engineer knowledgeable in dam design and analysis.

7.2 Recommendations/Remedial Measures.

1. A detailed hydrologic and hydraulic analysis should be conducted by a registered professional engineer knowledgeable in dam design and construction to increase the spillway capacity.

2. The concrete on the upstream slope of the dam, the concrete weir and spillway wingwalls should be repaired.

3. The low spot on the embankment crest should be filled to the design height.

4. It should be ascertained whether the upstream valve on the 16" cast iron pipe drainline is capable of operation. If the valve on the 8" and 16" pipes are operable they should be lubricated and excerised on a regular basis. If the upstream valves are not operable, they should be made operable or other provisions should be made for upstsream closure of the pipes through the embankment.

5. The brush and trees should be cleared from the slopes and removed from the spillway exit channel at the direction of a professional engineer knowledgeable in design and construction of dams.

6. A warning system should be developed to warn downstream residents of large spillway discharges or imminent failure of the dam.

7. A safety inspection program should be implemented with inspections at regular intervals by qualified personnel.

8. A regularly scheduled operations and maintenance program should be planned and implemented at the dam.

APPENDIX A
CHECKLIST, VISUAL INSPECTION, PHASE I

CHECK LIST
VISUAL INSPECTION
PHASE I

NAME OF DAM Pomeroy Memorial Reservoir Dam COUNTY Bradford STATE Pennsylvania ID# PA 40

TYPE OF DAM Earthfill HAZARD CATEGORY High

DATE(s) INSPECTION October 22, 1980 January 15, 1981 WEATHER Clear and cold TEMPERATURE 40° 20°

POOL ELEVATION AT TIME OF INSPECTION 1283.7 M.S.L. TAILWATER AT TIME OF INSPECTION None M.S.L.

INSPECTION PERSONNEL:

R. Jeffrey Kimball, P.E. - L. Robert Kimball and Associates

James T. Hockensmith - L. Robert Kimball and Associates

O.T. McConnell - L. Robert Kimball and Associates

Mr. Arthur Barrett - Borough Manager, Borough of Troy

O.T. McConnell
RECORDER

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None noted.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None noted.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Minimal erosion observed in the area of the low spot elevation located adjacent to the right spillway wingwall.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Appears to be all right except for low area adjacent to the right wingwall of the spillway.	
RIPRAP FAILURES	Deterioration of upstream slope paving.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	Brush and trees exist on the downstream slope of the dam and is concentrated in the areas of the abutments.	The brush and trees should be removed from the embankment slopes under the direction of a registered professional engineer knowledgeable in dam design and cosntruction.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Low spot area observed on the embankment crest adjacent to the right spillway wingwall. The concrete wingwalls in a deteriorated condition and a portion of the wall has cracked and fallen away from the structure.	The low spot should be filled and the right spillway wingwall repaired.
ANY NOTICEABLE SEEPAGE	No seepage observed. Although a wet area was observed beyond the toe of the dam between the spillway discharge channel and the drainline discharge structure.	
STAFF GAUGE AND RECORDER	None.	
DRAINS	None.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Not applicable.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Not applicable.	
DRAINS	Not applicable.	
WATER PASSAGES	Not applicable.	
FOUNDATION	Not applicable.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Not applicable.	
STRUCTURAL CRACKING	Not applicable.	
VERTICAL AND HORIZONTAL ALIGNMENT	Not applicable.	
MONOLITH JOINTS	Not applicable.	
CONSTRUCTION JOINTS	Not applicable.	
STAFF GAUGE OR RECORDER	Not applicable.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not observed.	
INTAKE STRUCTURE	Not observed. Valve control structure on upstream slope.	
OUTLET STRUCTURE	Outlet structure at toe of downstream slope.	
OUTLET CHANNEL	Unobstructed.	
EMERGENCY GATE	Valves for 16" and 18" lines housed in structure on upstream slope.	See Section 7.2 Recommendation no. 4

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Concrete appears to be in poor condition. Wingwalls are deteriorated and cracks were observed in the wingwalls. The right spillway wingwall has cracked and a portion of the wall has fallen away from the structure.	The concrete should be repaired.
APPROACH CHANNEL	Debris is beginning to collect in the area of the spillway approach channel.	The debris should be removed.
DISCHARGE CHANNEL	Heavy brush and trees exist in the discharge channel.	The debris should be removed from the spillway discharge channel.
BRIDGE AND PIERS	None.	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not applicable.	
APPROACH CHANNEL	Not applicable.	
DISCHARGE CHANNEL	Not applicable.	
BRIDGE AND PIERS	Not applicable.	
GATES AND OPERATION EQUIPMENT	Not applicable.	

DOWNSTREAM CHANNEL

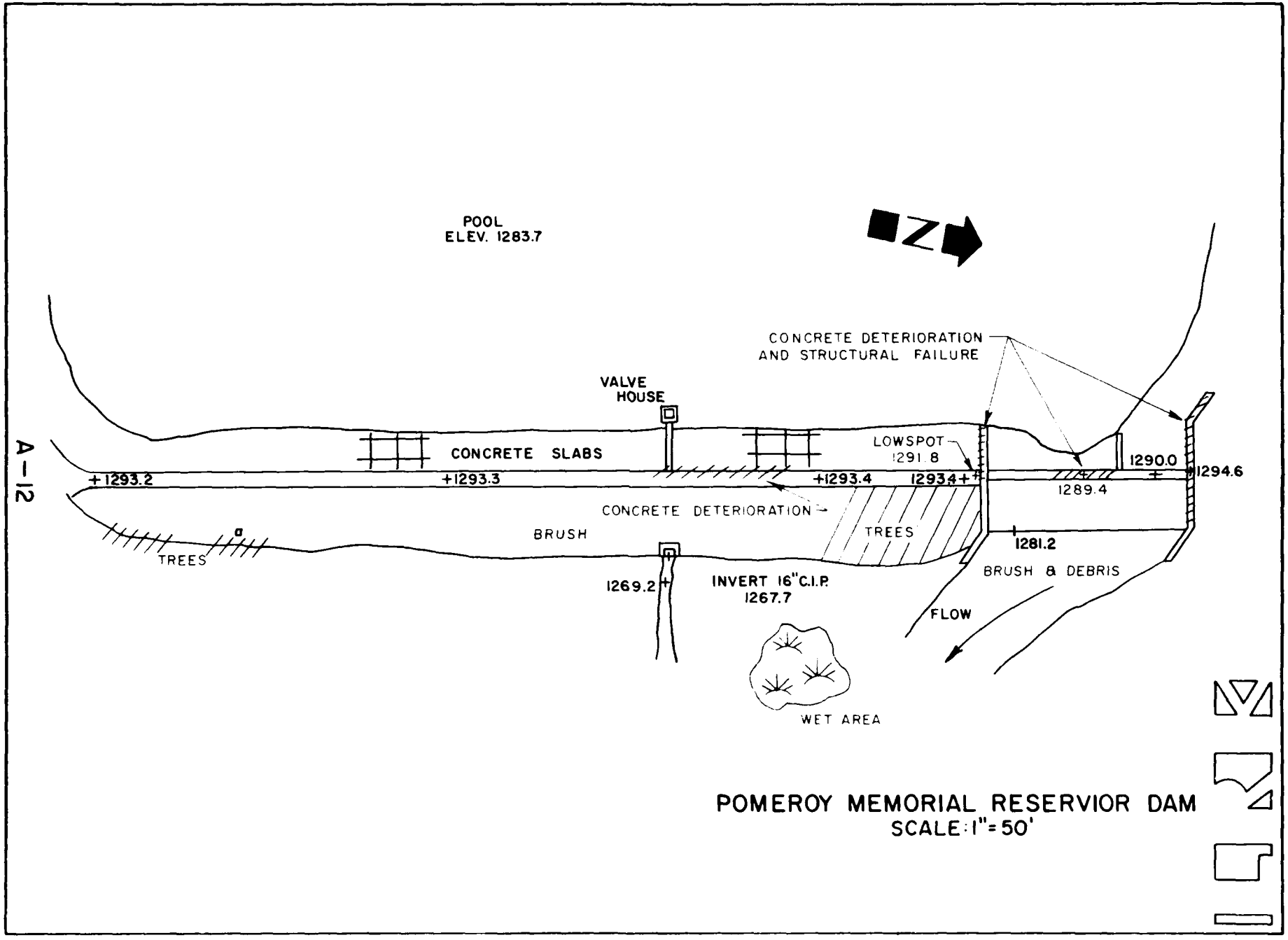
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The spillway discharge channel for the Pomeroy Memorial Reservoir Dam consists of the West Branch of Sugar Creek. Heavy brush exist in the discharge channel.	Brush and debris in the discharge channel should be removed.
SLOPES	Appear to be stable.	
APPROXIMATE NO. OF HOMES AND POPULATION	The Borough of Troy is located appoximately 2 miles downstream of the dam. The population of the Borough of Troy in excess of 1,000 people.	

RESERVOIR

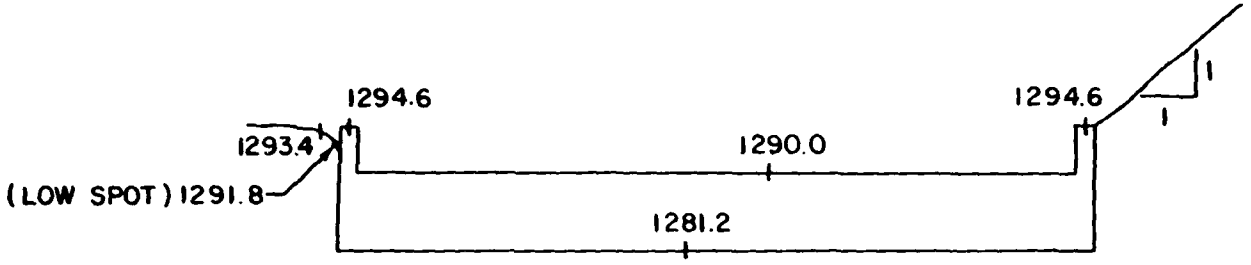
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Moderate to steep but appear to be stable.	
SEDIMENTATION	Due to the reduced water level in the reservoir sedimentation was observed collecting at the entrance to the spillway approach.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	No....	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	

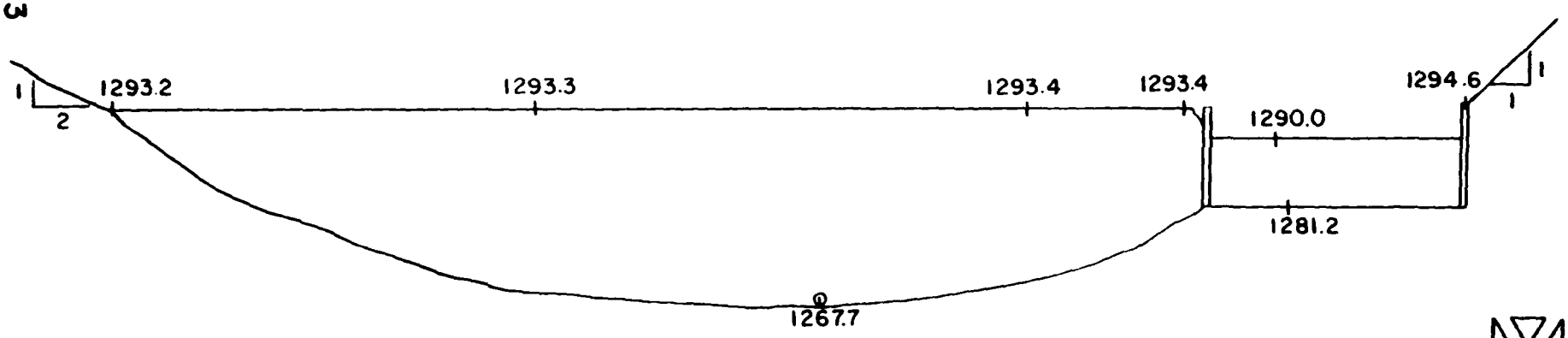


POMEROY MEMORIAL RESERVIOR DAM
SCALE: 1"= 50'



SPILLWAY PROFILE
LOOKING UPSTREAM
(SCALE: 1"=20')

A-13



PROFILE
LOOKING UPSTREAM
SCALE: HORIZ. 1"=50'
VERT. 1"=20'

POMEROY MEMORIAL RESERVIOR DAM

APPENDIX B
CHECKLIST, ENGINEERING DATA, DESIGN, CONSTRUCTION, OPERATION, PHASE I

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Pomeroy Memorial Reservoir Dam

ID# PA 40

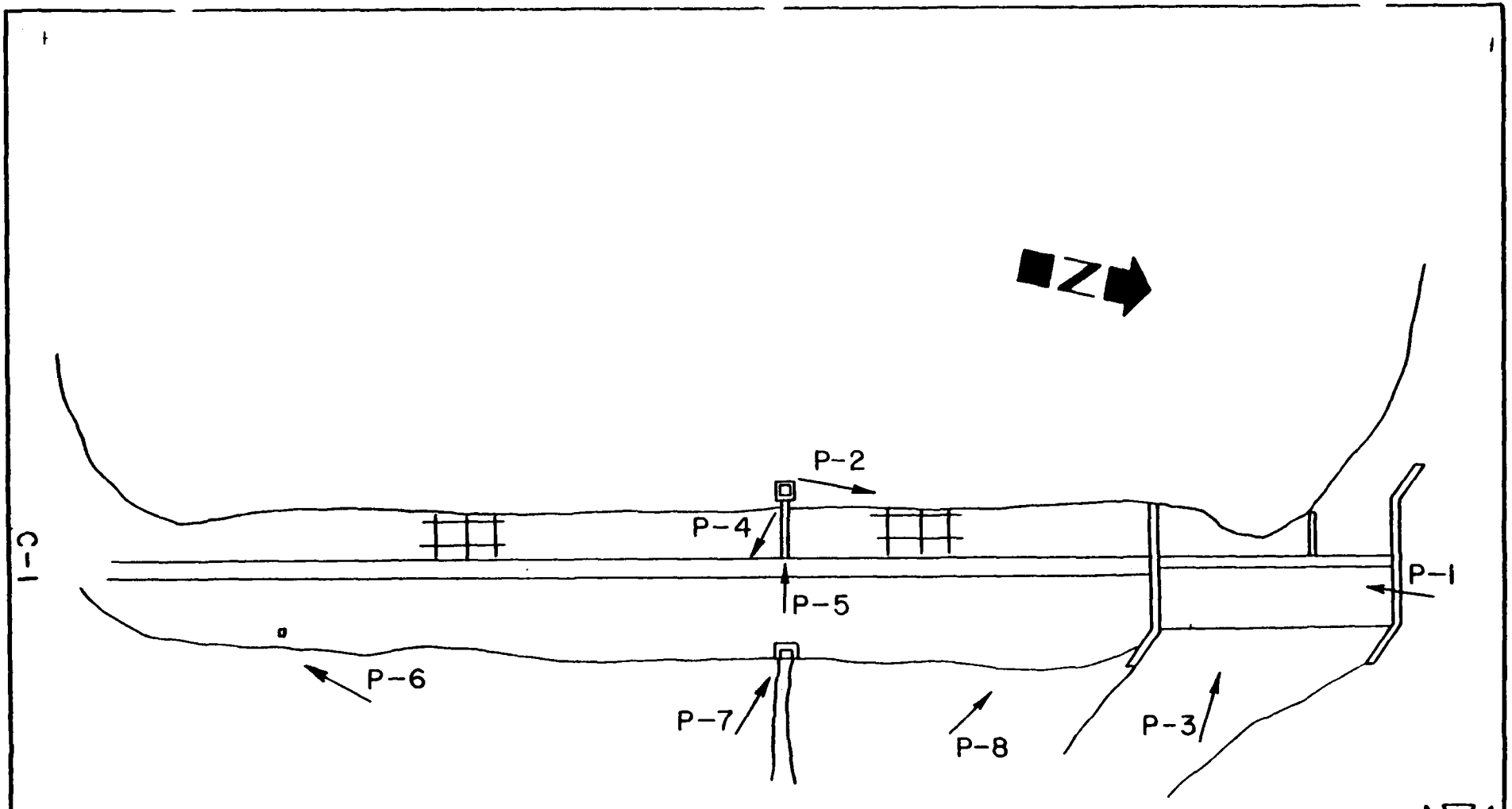
ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. quadrangle.
CONSTRUCTION HISTORY	Limited, information available in the DER files.
TYPICAL SECTIONS OF DAM	See Appendix E.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS RAINFALL/RESERVOIR RECORDS	See Appendix E. See Appendix E. Unknown. None. None.

ITEM	REMARKS
DESIGN REPORTS	Unknown.
GEOLOGY REPORTS	Unknown.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None.
POST-CONSTRUCTION SURVEYS OF DAM	None known to have occurred.
BORROW SOURCES	Unknown.

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	The height of the dam and concrete corewall were increased approximately 1.5 feet and the spillway weir was increased from 52 to 80 feet in 1931.
HIGH POOL RECORDS	None.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	It was reported by the Borough manager that a firm had been hired to do a study for a proposed modifications to the dam although the study has not progress pass the proposal stage.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Unknown.
MAINTENANCE OPERATION RECORDS	None.

ITEM	REMARKS
SPILLWAY PLAN *SECTIONS* DETAILS	See Appendix E.
OPERATING EQUIPMENT PLANS & DETAILS	See Appendix E.

APPENDIX C
PHOTOGRAPHS



POMEROY MEMORIAL RESERVIOR DAM
PHOTO INDEX

P - INDICATES PHOTO LOCATION

POMEROY MEMORAL RESERVOIR DAM
PA 40

Sheet 1

Front

(1) View of the right spillway wingwall, partial view of the spillway crest, the embankment crest and downstream slope. View towards the right abutment.

(2) View of upstream slope, spillway approach and left spillway wingwall. View towards the left abutment.

(3) View towards the downstream face of the spillway. View looking upstream from the discharge channel.

(4) Paving on upstream slope of the embankment. Note deterioration of the concrete.

Sheet 1

Back

(5) Top of intake control structure.

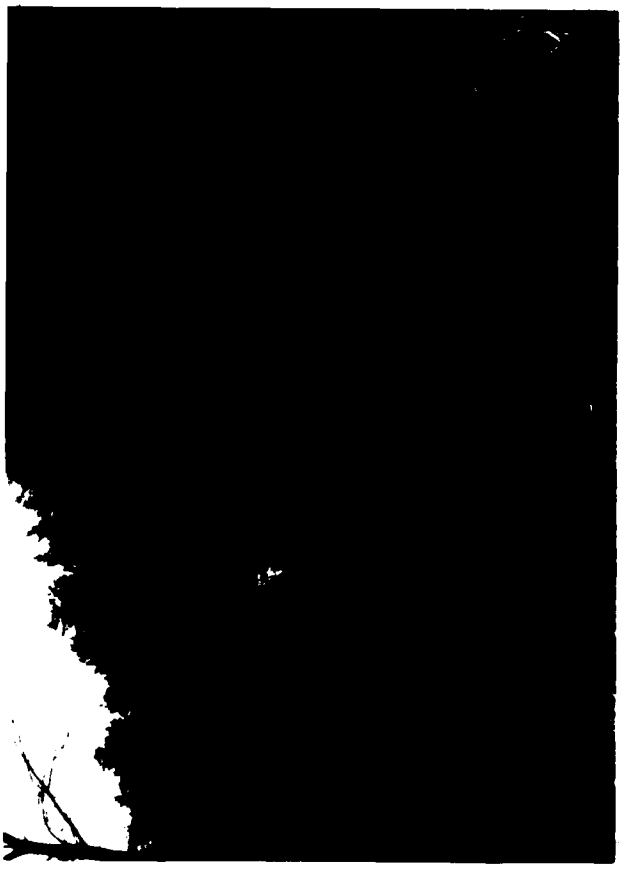
(6) Downstream slope of embankment. View towards the right abutment.

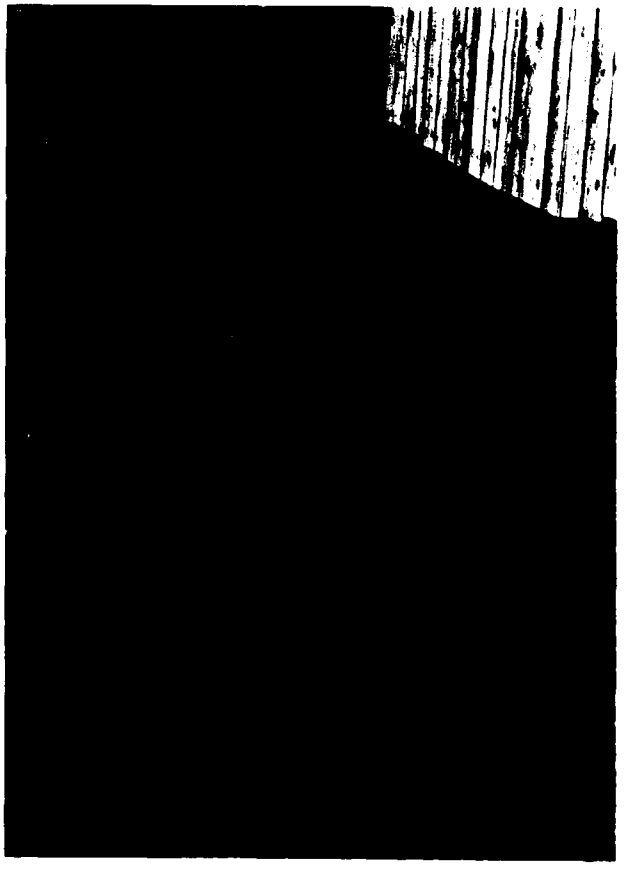
(7) View of downstream slope of embankment. Note the concrete outlet structure at the toe.

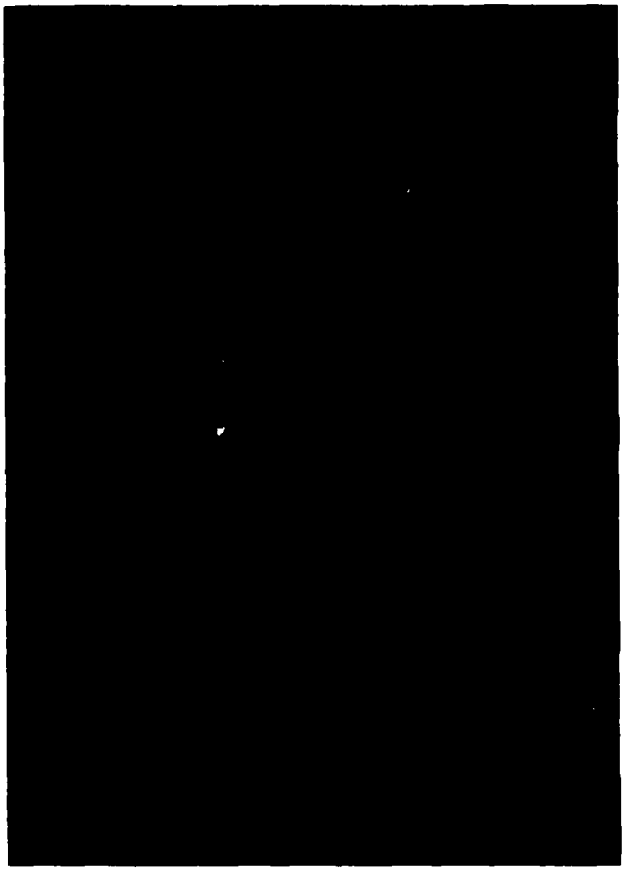
(8) View of wet area at the toe of the downstream slope between the spillway and the concrete outlet structure for the drainline.

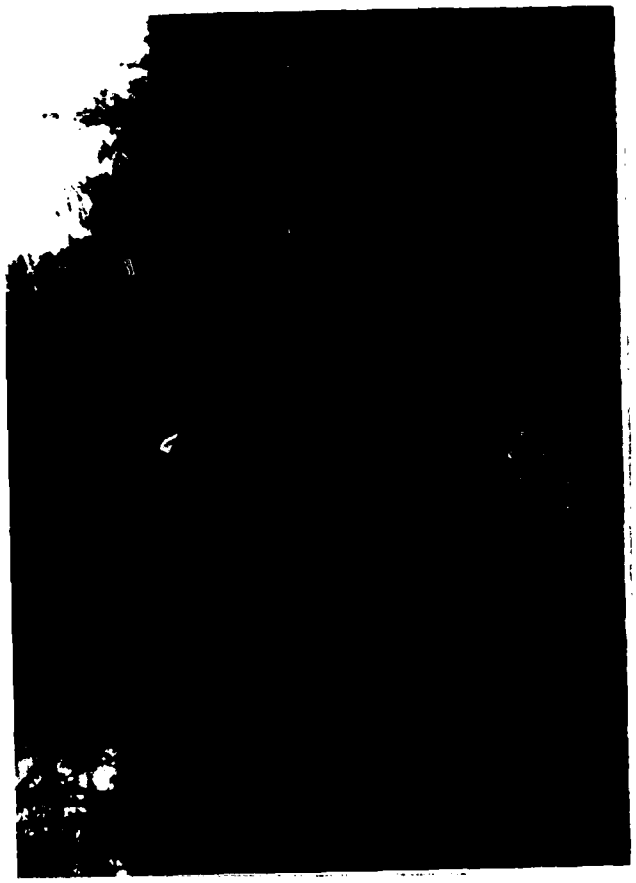
TOP OF PAGE

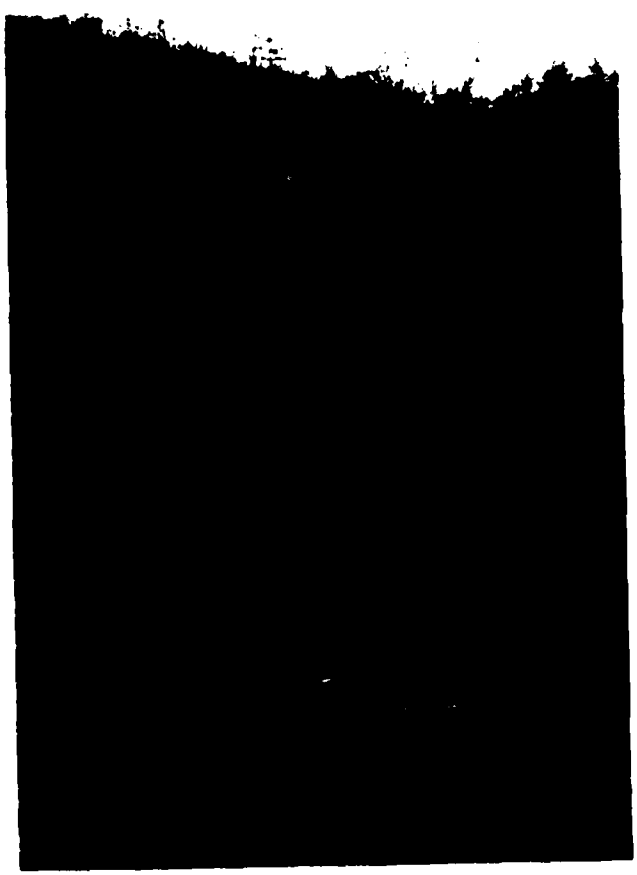
1,5	2,6
3,7	4,8

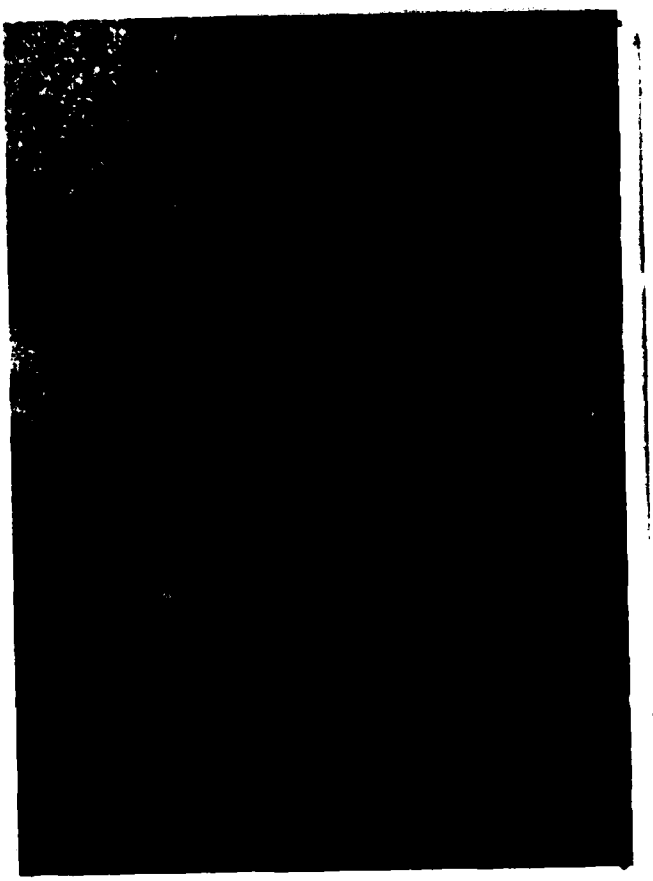












APPENDIX D
HYDROLOGY AND HYDRAULICS

APPENDIX D
HYDROLOGY AND HYDRAULICS

Methodology. The dam overtopping and breach analyses were accomplished using the systemized computer program HEC-1 (Dam Safety Investigation), September, 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. A brief description of the methodology used in the analysis is presented below.

1. Precipitation. The Probable Maximum Precipitation (PMP) is derived and determined from regional charts prepared from past rainfall records including "Hydrometeorological Report No. 40" prepared by the U.S. Weather Bureau.

The index rainfall is reduced from 10% to 20% depending on watershed size by utilization of what is termed the HOP Brook adjustment factor. Distribution of the total rainfall is made by the computer program using distribution methods developed by the Corps.

2. Inflow Hydrograph. The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for reservoir routing.

The unit hydrograph is developed using the Snyder method. This method requires calculation of several key parameters. The following list gives these parameters their definition and how they were obtained for these analysis.

Parameter	Definition	Where Obtained
Ct	Coefficient representing variations of watershed	From Corps of Engineers*
L	Length of main stream channel miles	From U.S.G.S. 7.5 minute topgraphic
Lca	Length on main stream to centroid of watershed	From U.S.G.S. 7.5 minute topographic
Cp	Peaking coefficient	From Corps of Engineers*
A	Watershed size	From U.S.G.S. 7.5 minute topographic

*Developed by the Corps of Engineers on a regional basis for Pennsylvania.

3. Routing. Reservoir routing is accomplished by using Modified Plus routing techniques where the flood hydrograph is routed through reservoir storage. Hydraulic capacities of the outlet works, spillways and the crest of the dam are used as outlet controls in the routing.

The hydraulic capacity of the outlet works can either be calculated and input or sufficient dimensions input and the program will calculate an elevation discharge relationship.

Storage in the pool area is defined by an area - elevation relationship from which the computer calculates storage. Surface areas are either planimetered from available mapping or U.S.G.S. 7.5 minute series topographic maps or taken from reasonably accurate design data.

4. Dam Overtopping. Using given percentages of the PMF the computer program will calculate the percentage of the PMF which can be controlled by the reservoir and spillway without the dam overtopping.

5. Dam Breach and Downstream Routing. The computer program is equipped to determine the increase in downstream flooding due to failure of the dam caused by overtopping. This is accomplished by routing both the pre-failure peak flow and the peak flow through the breach (calculated by the computer with given input assumptions) at a given point in time and determining the water depth in the downstream channel. Channel cross-sections taken from U.S.G.S. 7.5 minute topographic maps were used in the downstream flood wave routing. Pre and post failure water depths are calculated at locations where cross-sections are input.

HYDROLOGY AND HYDRAULICS ANALYSIS
DATA BASE

NAME OF DAM: Pomeroy Memorial Reservoir Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 (0.97) = 21.53 inches

STATION	1	2	3
Station Description	Pomeroy Memorial Reservoir Dam		
Drainage Area (square miles)	2.25		
Cumulative Drainage Area (square miles)	2.25		
Adjustment of PMF for Drainage Area (%)[1]			
6 hours	117		
12 hours	127		
24 hours	136		
48 hours	142		
72 hours	145		
Snyder Hydrograph Parameters			
Zone[2]	11		
Cp[3]	0.62		
Ct[3]	1.50		
L (miles)[4]	2.35		
Lca (miles)[4]	1.17		
tp = Ct(LxLca) 0.3 hrs.	2.03		
Spillway Data			
Crest Length (ft)	80		
Freeboard (ft)	1.8		
Discharge Coefficient	3.5		
Exponent	1.5		

(1) Hydrometeorological Report 40 (Figure 1), U.S. Weather Bureau & U.S. Army Corps of Engineers, 1965.
(2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's coefficients (C_p and C_t).
(3) Snyder's Coefficients.
(4) L=Length of longest water course from outlet to basin divide. L_{ca}=Length of water course from outlet to point opposite the centroid of drainage area.

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 2.25 miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1290.0 [54 ac-ft]

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N/A

ELEVATION MAXIMUM DESIGN POOL: Unknown

ELEVATION TOP DAM: 1291.8 low spot

SPILLWAY CREST:

a. Elevation 1290.0
b. Type Modified ogee
c. Width Crest length = 80 feet
d. Length Not applicable
e. Location Spillover Left abutment
f. Number and Type of Gates None

OUTLET WORKS:

a. Type One 16" CIP and one 8" CIP
b. Location Mid embankment
c. Entrance inverts 1270 - approximate
d. Exit inverts 1267.7
e. Emergency drawdown facilities Presently 8" CIP Blow-off

HYDROMETEOROLOGICAL GAUGES:

a. Type None
b. Location None
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: Unknown

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG PENNSYLVANIA

NAME Pomeroy Memorial Res.
NUMBER PA-40
SHEET NO. 1 OF
BY DTM DATE 12/90

Loss Rate and Base Flow Parameters

As recommended by the Baltimore District Corps of Engineers.

STRTL = 1 inch
CNSTL = 0.05 in/hr.
STRTQ = 1.5 c.f.s./mi²
QRCSN = 0.05 (5% of Peak Flow)
RTIOR = 2

Elevation - Area Relationships

From U.S.G.S. 7.5 min. Quad, Penn Der File and Field Inspection Data.

Spillway crest elevation estimated from U.S.G.S. 7.5-min Quad. = 1290'
Maximum Storage Capacity = 75 Ac.Ft
Normal Pool Storage Capacity = 54 Ac.Ft
Area at Normal Pool = 9.2 acres
From the Conic Method for Reservoir Volume. Flood Hydrograph Package (HEC-1) Dam Safety Version (User's Manual).

$H = 3V/A$
$= 3(54)/9.2$
$= 17.66$ ft. use 17.6 ft.

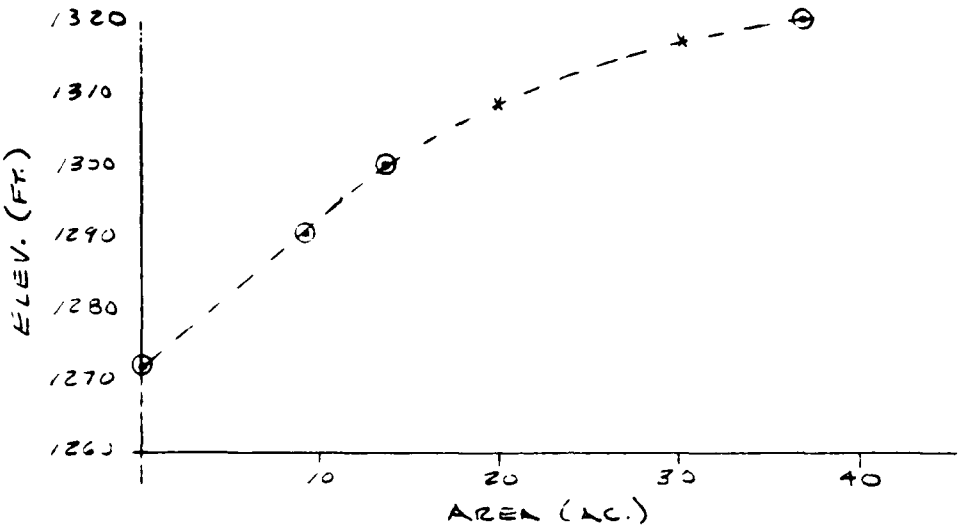
Elevation where area equals zero;

1290' - 17.6' = 1272.4'

At elev. 1300, area = 13.8 acres
At elev. 1320, area = 36.7 acres

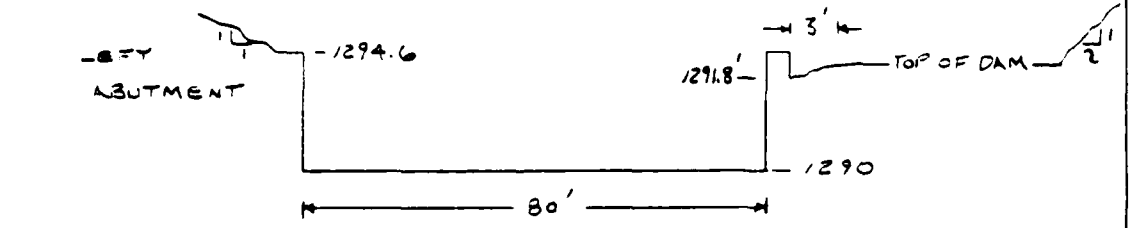
L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG PENNSYLVANIA

NAME
NUMBER PA-40
SHEET NO. 2 OF
BY OTM DATE 12/80



AREA (AC)	0	9.2	13.8	*20	*30	36.7
ELEV. (FT)	1272.4	1290	1300	1308	1317	1320

DISCHARGE RATING



SPILLWAY PROFILE
VIEWING DOWNSTREAM
NOT TO SCALE

FROM $Q = CLH^{3/2}$

WHERE C = 3.5
L = 80'
H = VARIABLE

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG PENNSYLVANIA

NAME
NUMBER PA-40
SHEET NO. 3 OF
BY OTM DATE 12/80

ELEVATION (FT)	h (FT)	DISCHARGE *Q (c.f.s.)
1290.0	0	0
1290.5	0.5	100
1291.0	1.0	280
1291.5	1.5	510
1291.8	1.8	680
1293.0	3.0	1450
1295.0	5.0	3130

* VALUES ROUNDED TO NEAREST 10 c.f.s.

OVERTOPPING PARAMETERS

TOP OF DAM ELEVATION (LOW SPOT) = 1291.8'
LENGTH OF DAM (EXCLUDING SPILLWAY) = 360'
COEFFICIENT OF DISCHARGE (C) = 2.9

$L	3'	10'	360'	400'	450'
$Y	1291.8	1292	1293	1294	1296

ESTIMATED FROM FIELD DATA AND U.S.G.S. 7.5-MIN. QUAD.

BREACH ANALYSIS

PLAN 1: CONSIDER A FAILURE ADJACENT TO THE RIGHT SPILLWAY WINGWALL DUE TO OVERTOPPING.

*BRWID = 10'
Z = 0.5
ELBM = 1267.7
TFAIL = 2 HRS
WSEL = 1290
FAILEL = 1293

% PMF = 30

REACH CROSS SECTIONS FROM U.S.G.S. 7.5 MIN. QUAD.

* BRWID > 10' DISTORTS MODEL DUE TO LOW STORAGE IN DAM WHEN BREACH IS CONSIDERED.

PLAN 2: ASSUME NO BREACH.

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1          A1       ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
    2          A2       HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF POMEROY MEMORIAL RES.(PA-40)
    3          A3       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR
    4          B    288       0      15       0       0       0       0       0      -4       0
    5          B1     5
    6          J      1       4       1
    7          J1    .1      .3      .5       1
    8          R      0       1                                       1
    9          K1       INFLOW
   10          M      1       1   2.25                                1
   11          P            21.53     117     127     136     142     145
   12          T                                                    1.0    0.05
   13          W   2.03    0.62
   14          X   -1.5    -.05     2.0
   15          K      1       2                                       1
   16          K1       ROUTE THRU RESERVOIR
   17          Y                                       I       I
   18          Y1     1                                                -1290      -1
   19          Y4  1290  1290.5    1291  1291.5  1291.8    1293    1295
   20          Y5     0     100     280     510     680    1450    3130
   21          $A     0     9.2    13.8      20      30    36.7
   22          $E1272.4    1290    1300    1308    1317    1320
   23          $S  1290
   24          $D1291.8     2.9     1.5       3
   25          $L     3      10     360     400     450
   26          $VI291.8    1292    1293    1294    1296
   27          K     99
```

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********

RUN  DATE= 81701722.
     TIME= 07.48.08.
```

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF POMEROY MEMORIAL RES.(PA-40)
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
288	0	15	0	0	0	0	0	-4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1

RTIOS= .10 .30 .50 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	2.25	0.00	2.25	1.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.53	117.00	127.00	136.00	142.00	145.00	0.00

LOSS DATA

LROPT	STRTR	DLTKR	RTIOL	ERAIN	STRKS	RTIOR	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP 2.03 CP= .62 NTA= 0

RECESSION DATA
STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 45 END-OF-PERIOD ORDINATES, LAG= 2.02 HOURS, CP= .62 VOL= 1.00

19.	70.	140.	220.	304.	377.	428.	455.	453.	417.
365.	320.	280.	245.	214.	187.	164.	143.	125.	110.
96.	84.	74.	64.	56.	49.	43.	38.	33.	29.
25.	22.	19.	17.	15.	13.	11.	10.	9.	8.

7. 6. 5. 4. 4.

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	END-OF-PERIOD FLOW MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	31.22	28.49	2.73	167712.
										(793.)	(724.)	(69.)	(4749.07)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1290.	-1

STAGE	1290.00	1290.50	1291.00	1291.50	1291.80	1293.00	1295.00
FLOW	0.00	100.00	280.00	510.00	680.00	1450.00	3130.00
SURFACE AREA=	0.	9.	14.	20.	30.	37.	
CAPACITY=	0.	54.	168.	303.	526.	626.	
ELEVATION=	1272.	1290.	1300.	1308.	1317.	1320.	

CREL	SPWID	COQW	EXPW	ELEVL	COOL	CAREA	EXPL
1290.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1291.8	2.9	1.5	3.

CREST LENGTH AT OR BELOW ELEVATION	3. 1291.8	10. 1292.0	360. 1293.0	400. 1294.0	450. 1296.0

PEAK OUTFLOW IS 714. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 2159. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 3599. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 7197. AT TIME 41.75 HOURS

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .10	RATIO 2 .30	RATIO 3 .50	RATIO 4 1.00
HYDROGRAPH AT	1	2.25	1	719.	2156.	3594.	7187.
	(	5.83)	(	20.35)(	61.05)(	101.76)(	203.61)(
ROUTED TO	2	2.25	1	714.	2159.	3599.	7197.
	(	5.83)	(	20.21)(	61.14)(	101.90)(	203.78)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1290.00	1290.00	1291.80
STORAGE	54.	54.	71.
OUTFLOW	0.	0.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1291.85	.05	72.	714.	1.00	41.75	0.00
.30	1293.13	1.33	85.	2159.	6.25	41.75	0.00
.50	1293.72	1.92	91.	3599.	8.25	41.75	0.00
1.00	1294.83	3.03	103.	7197.	10.75	41.75	0.00

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************
    1          A1       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
    2          A2       DOWNSTREAM CONDITIONS DUE TO OVERTOPPING (POMEROY DAM PA-175)
    3          A3       PLAN 1 ASSUMES BREACH, PLAN 2 ASSUMES NO BREACH
    4          B   288       0      15       0       0       0       0       0      -4       0
    5          B1    8
    6          J     2       1       1
    7          J1   .3
    8          K     0       1                                               1
    9          K1       INFLOW
   10          M     1       1    2.25                       1                               1
   11          P           21.53     117     127     136     142     145
   12          T                                                 1.0    0.05
   13          W  2.03    0.62
   14          X -1.5    -.05    2.0
   15          K     1       2                                               1
   16          K1       ROUTE THRU RESERVOIR
   17          Y                                       1       1
   18          Y1    1                                                 -1290      -1
   19          Y4 1290  1290.5    1291  1291.5  1291.8    1293    1295
   20          Y5    0     100     280     510     680    1450    3130
   21          SA    0     9.2    13.8      20      30    36.7
   22          SE1272.4    1290    1300    1308    1317    1320
   23          SS 1290
   24          SD1291.8     2.9     1.5       3
   25          SL    3      10     360     400     450
   26          SV1291.8    1292    1293    1294    1295
   27          SB   10      .5    1280       1    1290    1293
   28          SB   10      .5    1280       1    1290    1300
   29          K     1       3                                               1
   30          K1       REACH NO. 1
   31          Y                                       1       1
   32          Y1    1
   33          Y6  .06     .05     .06    1193    1240    4500    .018
   34          Y7    0     1240     300    1220     650    1200     652    1198     656    1198
   35          Y7  658     1200    1100    1220    1400    1240
   36          K     1       4                                               1
   37          K1       REACH NO. 2
   38          Y                                       1       1
   39          Y1    1
   40          Y6  .06     .05     .06    1098    1140    6000   .0167
   41          Y7    0     1140     250    1120     450    1100     452    1098     456    1098
   42          Y7  458     1100     525    1120     600    1140
   43          K    99
```

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********

RUN  DATE= 81/01/26.
     TIME= 08.28.26.
```

RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
DOWNSTREAM CONDITIONS DUE TO OVERTOPPING (POMEROY DAM PA-175)
PLAN 1 ASSUMES BREACH, PLAN 2 ASSUMES NO BREACH

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
288	0	15	0	0	0	0	0	-4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 2 NRTIO= 1 LRTIO= 1

RTIOS= .30

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	2.25	0.00	2.25	1.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.53	117.00	127.00	136.00	142.00	145.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.03 CP= .62 NTA= 0

RECESSION DATA
STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 45 END-OF-PERIOD ORDINATES, LAG= 2.02 HOURS, CP= .62 VOL= 1.00

19.	70.	140.	220.	304.	377.	428.	455.	453.	417.
365.	320.	280.	245.	214.	187.	164.	143.	125.	110.
96.	84.	74.	64.	56.	49.	43.	38.	33.	29.
25.	22.	19.	17.	15.	13.	11.	10.	9.	8.

7. 6. 5. 4. 4.

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
							SUM			31.22	28.49	2.73	167712.
										(793.)(	724.)(	69.)(	4749.07)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1290.	-1

STAGE	1290.00	1290.50	1291.00	1291.50	1291.80	1293.00	1295.00
FLOW	0.00	100.00	280.00	510.00	680.00	1450.00	3130.00
SURFACE AREA=	0.	9.	14.	20.	30.	37.	
CAPACITY=	0.	54.	168.	303.	526.	626.	
ELEVATION=	1272.	1290.	1300.	1308.	1317.	1320.	

CREL	SPWID	COQW	EXPW	ELEVL	COOL	CAREA	EXPL
1290.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1291.8	2.9	1.5	3.

CREST LENGTH AT OR BELOW ELEVATION	3. 1291.8	10. 1292.0	360. 1293.0	400. 1294.0	450. 1296.0

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
10.	.50	1280.00	1.00	1290.00	1293.00

BEGIN DAM FAILURE AT 41.00 HOURS

PEAK OUTFLOW IS 2602. AT TIME 42.00 HOURS

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL

```
                                    10.     .50 1280.00    1.00 1290.00 1300.00

PEAK OUTFLOW IS     2159. AT TIME  41.75 HOURS


**********          **********          **********          **********          **********

                                  HYDROGRAPH ROUTING

                          REACH NO. 1

                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                    3       1       0       0       0       0       1       0       0

                                                ALL PLANS HAVE SAME
                                                  ROUTING DATA
                                 CLOSS   CLOSS     AVG    IRES   ISAME    ITOPT    IPNP              LSTR
                                   0.0   0.000    0.00       1       1        0       0                 0

                                NSTPS   NSTDL     LAG   AMSKK       X     YSK   STORA  ISPRAY
                                    1       0       0   0.000   0.000   0.000      0.       0

D-20

NORMAL DEPTH CHANNEL ROUTING

                 QNT1T   QNT2T   QNT3T   ELNVT   ELMAX   RLNTH     SEL
                 .0600   .0500   .0600  1193.0  1240.0    4500.  .01800

          CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
                0.00 1240.00  300.00 1220.00  650.00 1200.00  652.00 1198.00  656.00 1198.00
              658.00 1200.00 1100.00 1220.00 1400.00 1240.00

  STORAGE       0.00    0.00    0.00    1.95   20.77   64.83  133.51  227.43  346.39
///490.37
              659.39  853.42 1068.95 1303.45 1556.91 1829.33 2120.72 2431.08 2760.40
//3108.68

  OUTFLOW       0.00    0.00    0.00   87.89 1039.36 4369.06 11248.39 22668.03 39517.48
/62617.44
            92737.31 130812.39 179287.47 236204.19 301959.83 376954.50 461587.39 556254.84 661349.17
777258.18

    STAGE    1193.00 1195.47 1197.95 1200.42 1202.89 1205.37 1207.84 1210.32 1212.79
```

//1215.26	1217.74	1220.21	1222.68	1225.16	1227.63	1230.11	1232.58	1235.05	1237.53
//1240.00									
FLOW	0.00	0.00	0.00	87.89	1039.36	4369.06	11248.39	22668.03	39517.48
762617.44	92737.31	130812.39	179287.47	236204.19	301959.83	376954.50	461587.39	556256.84	661349.17
777258.18									

MAXIMUM STAGE IS 1204.0

MAXIMUM STAGE IS 1203.7

****

HYDROGRAPH ROUTING

REACH NO. 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0600	.0500	.0600	1098.0	1140.0	6000.	.01670

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1140.00 250.00 1120.00 450.00 1100.00 452.00 1098.00 456.00 1098.00
458.00 1100.00 525.00 1120.00 600.00 1140.00

STORAGE	0.00	1.93	9.71	26.48	52.23	86.97	130.70	183.41	245.11
//1315.79									
	395.46	485.18	585.84	697.44	819.97	953.44	1097.85	1253.19	1419.47
//1596.69									
OUTFLOW	0.00	66.69	406.21	1354.87	3187.61	6137.42	10414.05	16211.39	23711.44
733086.85									
	44473.16	57554.86	73176.79	91527.27	112789.93	137143.63	164762.66	195817.04	230472.83
268892.39									
STAGE	1098.00	1100.21	1102.42	1104.63	1106.84	1109.05	1111.26	1113.47	1115.68
//1117.89									
	1120.11	1122.32	1124.53	1126.74	1128.95	1131.16	1133.37	1135.58	1137.79
//1140.00									
FLOW	0.00	66.69	406.21	1354.87	3187.61	6137.42	10414.05	16211.39	23711.44
233086.85									
	44473.16	57554.86	73176.79	91527.27	112789.93	137143.63	164762.66	195817.04	230472.83
268892.39									

MAXIMUM STAGE IS 1105.9

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .30
HYDROGRAPH AT	1	2.25 (5.83)	1	2186. (61.05)
			2	2156. (61.05)
ROUTED TO	2	2.25 (5.83)	1	2602. (73.69)
			2	2159. (61.14)
ROUTED TO	3	2.25 (5.83)	1	2475. (70.03)
			2	2143. (60.67)
ROUTED TO	4	2.25 (5.83)	1	2410. (68.23)
			2	2134. (60.43)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1290.00	1290.00	1291.80
STORAGE	54.	54.	71.
OUTFLOW	0.	0.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.30	1293.06	1.26	84.	2602.	3.25	42.00	41.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1290.00	1290.00	1291.80
STORAGE	54.	54.	71.
OUTFLOW	0.	0.	680.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.30	1293.13	1.33	85.	2159.	6.25	41.75	0.00

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.30	2475.	1204.0	42.00

PLAN 2 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.30	2143.	1203.7	41.75

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS

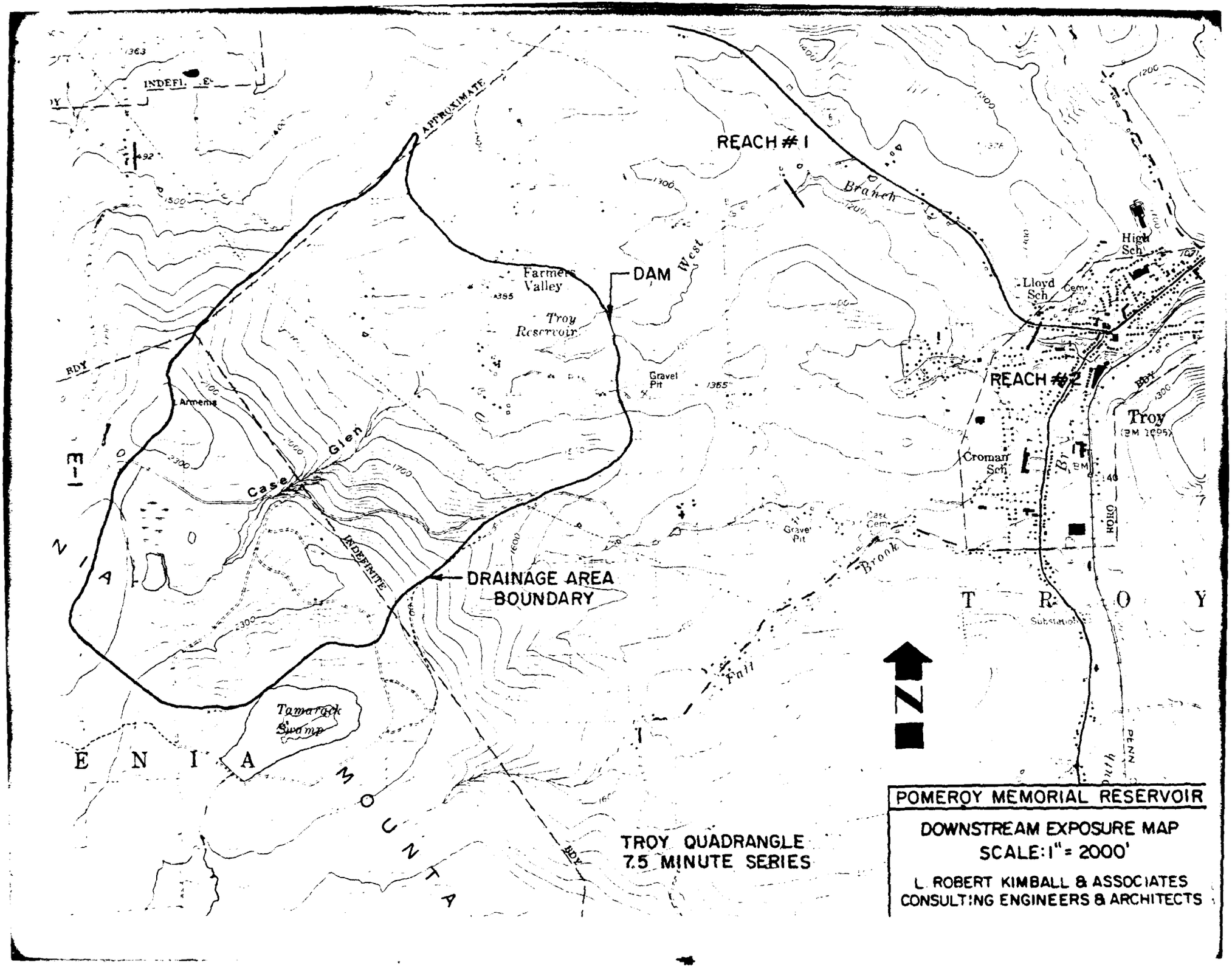
18/18

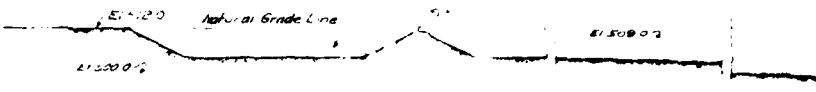
.30	2410.	1105.9	42.28

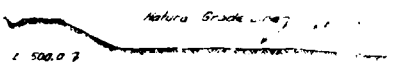
PLAN 2 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.30	2134.	1105.6	42.00

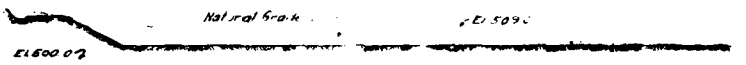
APPENDIX E
DRAWINGS

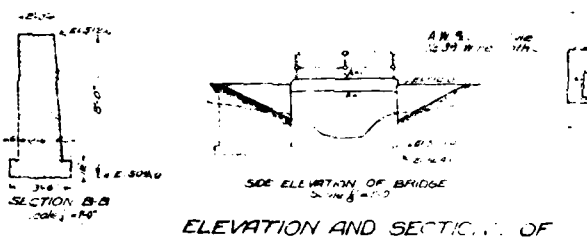

REACH #1
DAM
Farmers Valley
Troy Reservoir
Gravel Pit
REACH #2
Troy
Lloyd Sch
High Sch
Croman Sch
Case Glen
Armenia
DRAINAGE AREA BOUNDARY
Tamarack Swamp
Substation
TROY QUADRANGLE
7.5 MINUTE SERIES
N
POMEROY MEMORIAL RESERVOIR
DOWNSTREAM EXPOSURE MAP
SCALE: 1" = 2000'
L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS



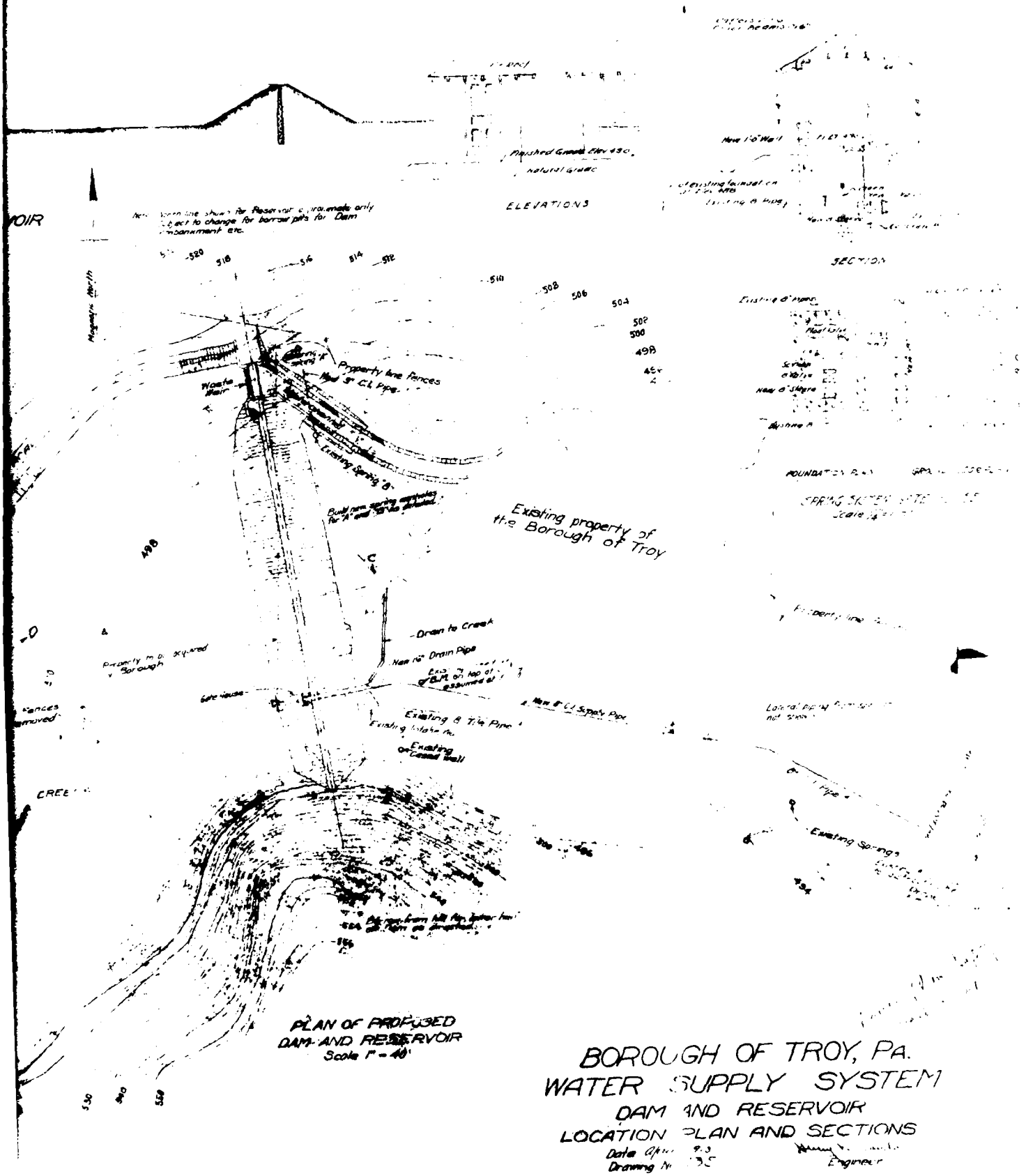


SECTIONS OF RESERVOIR





ELEVATION AND SECTION OF CREEK BRIDGE

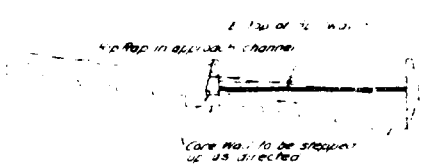


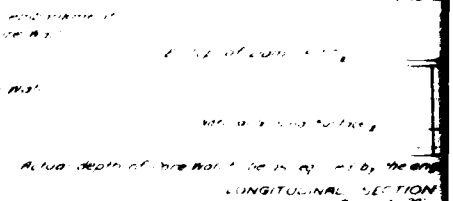
BOROUGH OF TROY, PA.
WATER SUPPLY SYSTEM
DAM AND RESERVOIR
LOCATION PLAN AND SECTIONS

Date Oct. 9.3
Drawing No. 35

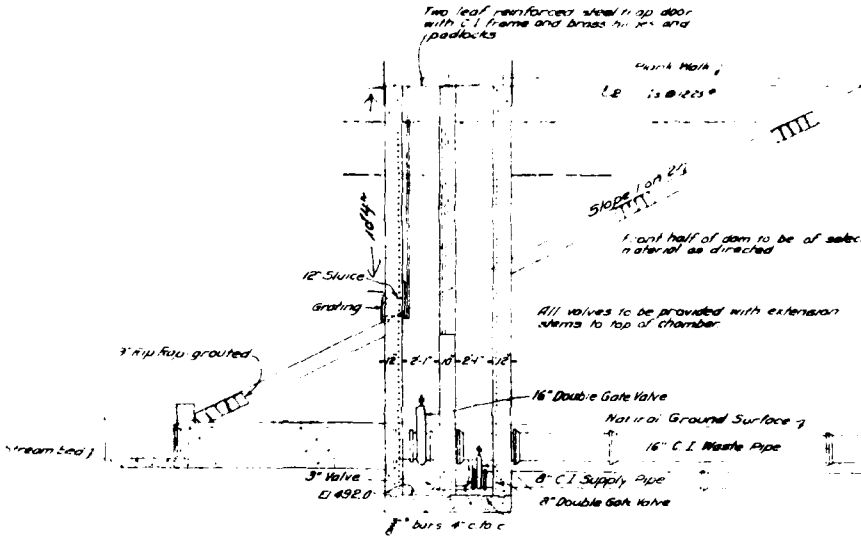
Engineer

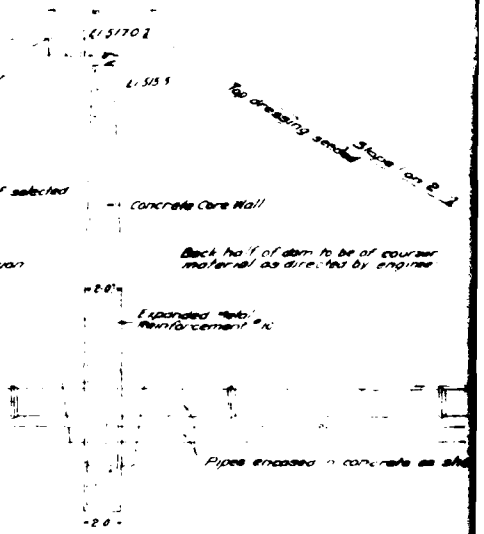
E 2



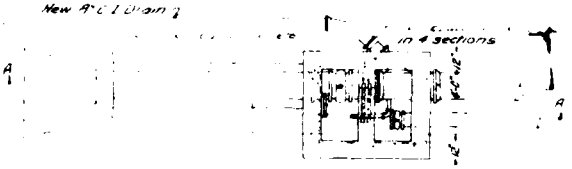


LONGITUDINAL SECTION
Scale 1" = 20'

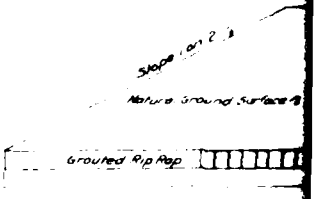




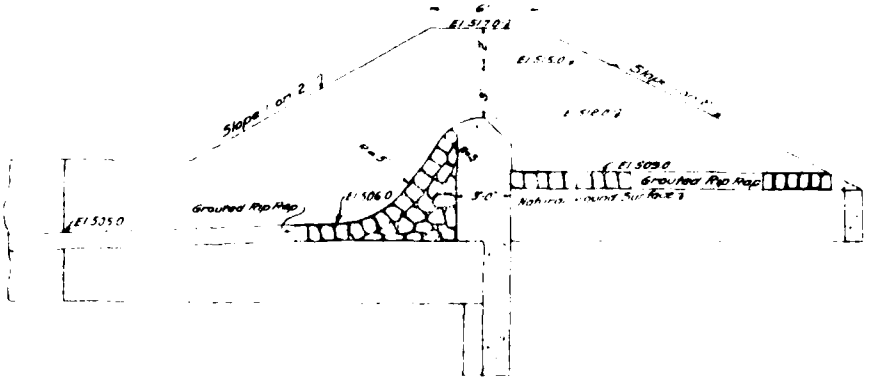
TYPICAL SECTION OF DAM AND SECTION A-A OF GATE CHAMBER
Scale 1" = 4'



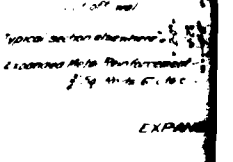
PLAN OF GATE CHAMBER
Scale 1/4" = 1'-0"



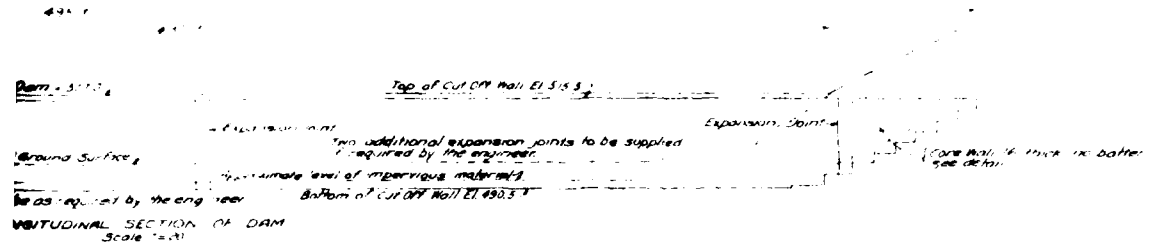
SECTION

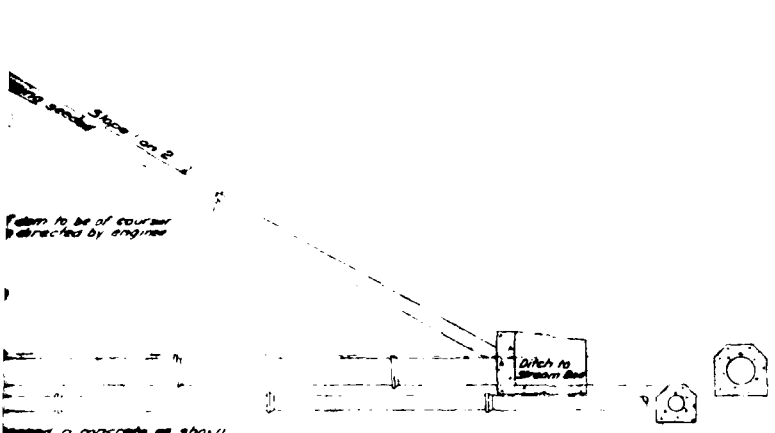


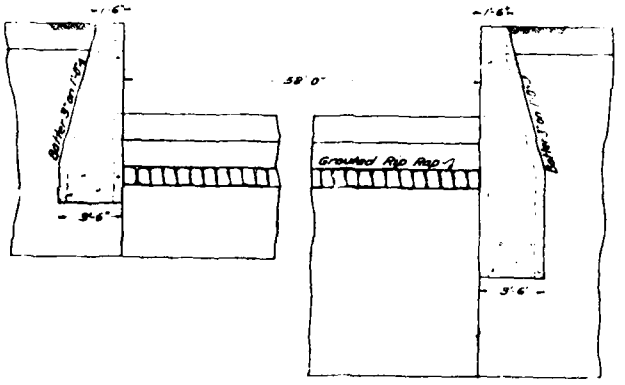
SECTION B-B OF SPILLWAY
Scale 1/4" = 1'-0"

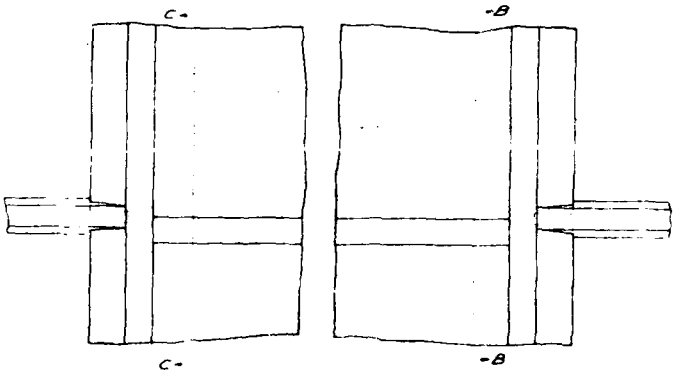


EXPAN

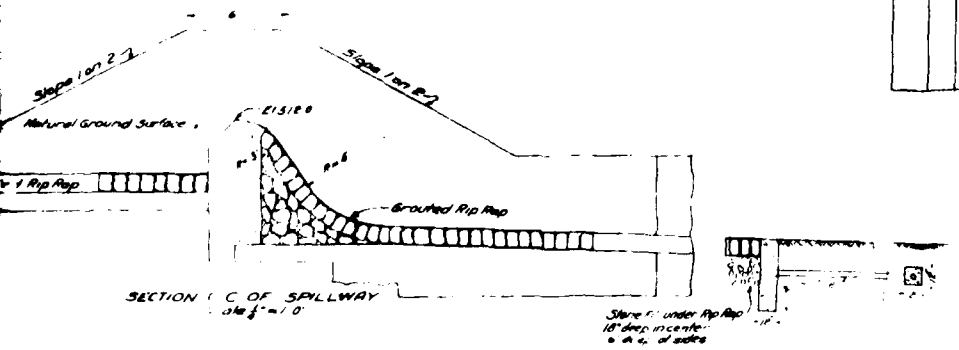




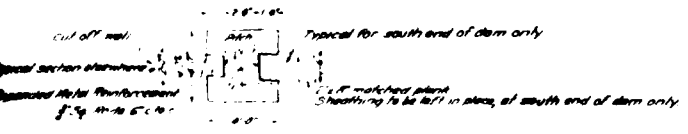




SECTION AND PLAN
SPILLWAY
Scale 1/4" = 1'0"



SECTION C C OF SPILLWAY
Scale 1/4" = 1'0"



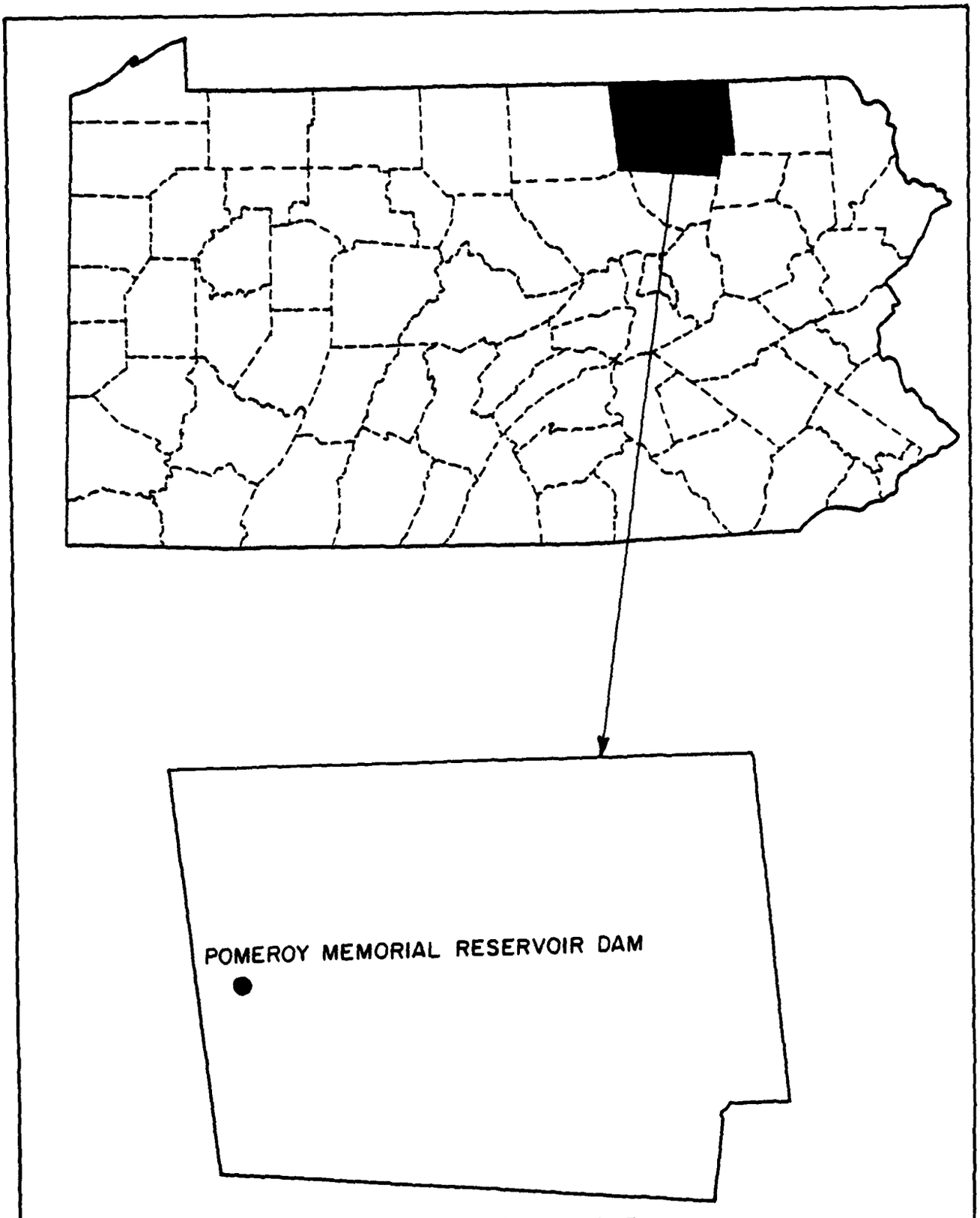
EXPANSION JOINT DETAIL
Scale 1/4" = 1'0"

BOROUGH OF TROY, PA.
WATER SUPPLY SYSTEM
DAM AND RESERVOIR
SECTIONS AND DETAILS

Date April 4, 1913
Drawing No. 136
Revised Sept 14, 1912
Oct 3, 1912

Engineer

E 3



SITE LOCATION MAP
BRADFORD COUNTY, PENNSYLVANIA

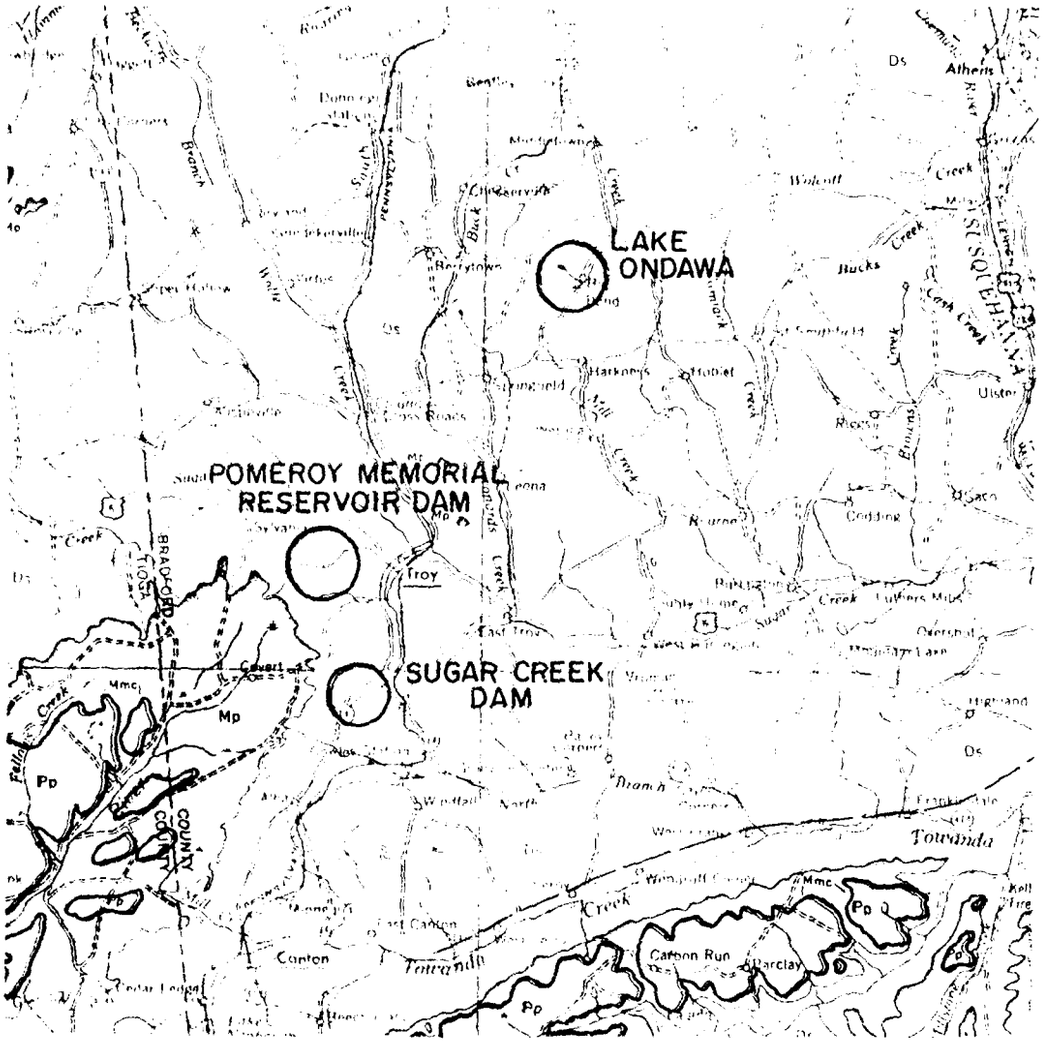
APPENDIX F
GEOLOGY

General Geology

The Pomeroy Memorial Reservoir Dam is located in the (Glaciated) Low Plateaus of the Appalachian Plateaus Province. The topography is deeply dissected leaving only remnants of the plateau surface. The entire area lies north of the Wisconsin glacial border and the bedrock is therefore covered in many places by glacial drift or outwash. These water-bearing materials in this area.

Where the bedrock is exposed, it consists of sandstones, shales, and graywackes of the Susquehanna Group of Upper Devonian Age. This group, from youngest to oldest, contains the Oswayo Formation, Catskill Formation, and Marine Beds which include "Chemung" and "Portage" beds. The dam lies on the Catskill side of the Catskill/Chemiung contact.

Structurally, these strata strike to the northeast-east and dip to the southeast in the study area. This is due to the dam being located on the northwestern flank of the Blossburg Syncline, which is the common limb of the Wellsboro Anticline. The geologic structure is typical of the Plateaus province, which has a series of well-defined folds trending northeast-east. These is no major faulting indicated in the vicinity of the dam.



GEOLOGIC MAP OF AREA AROUND POMEROY MEMORIAL RESERVOIR DAM, SUGAR CREEK DAM AND LAKE ONDAWA DAM

SCALE 1:250,000

DEVONIAN

UPPER

CENTRAL AND EASTERN PENNSYLVANIA

Dsc

Catskill Formation

Susquehanna Group